San Carlos School District
UES Waste Management Grant
Campus Needs Assessment Plan
for the
San Carlos Charter Learning Center

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Lesson 1: How did my piece of paper get here? Where is it going?

Context Based Learning Objective:
Learners will be able to map the life cycle of a piece of paper, and comprehend the past and future of the paper in front of them.

Learners will identify the methods of waste management employed on our campus.

Standards Addressed:

Science 6.C. *Students know the natural origin of the materials used to make common objects.*

Writing Strategies 1.3 *Organization and Focus - Use of a variety of effective and coherent organizational patterns . . . .*

Summary Description:

Ask the learners from where the piece of paper on their desk came. On the whiteboard, build a flow chart of the learner's ideas. Be sure to ask the learners where their idea fits in the life cycle of paper. Model for the learners how to build a flow chart by organizing their ideas of the origin of paper. Be sure to include the steps of manufacturing and delivery in the chart.

Next ask the learners where does the paper go from here? Now have the learners work in small groups to develop a flow chart of where the paper goes from here! Learners record these cycles on chart paper which is then hung in the front of the room for discussion

Are there any similarities and/or differences between the charts?

After discussing the flow charts it is time to find out what the learners know about Waste management on our campus. Record all of the following on Chart paper for future reference.

What ways do we dispose of waste on our campus? *Trash, Recycling, Compost.*
Where does trash go when it leaves school? record all ideas
Where does recycling go when it leaves school? record all ideas
What happens to the compost bin? record all ideas

Assessment: The flow charts should be saved and used as a pretest for this unit. At the end of this unit, the learners will be asked to construct another flow chart for paper to demonstrate what they have learned.
Note: Flow charts will be scored as follows:
1 point for each step that makes sense.
1 point for each successful relationship/connection between steps.
Total points on each flow chart will be compared to note a change in awareness/knowledge.

Timeline: 1 45 minute period

Lesson 2: **What is a Landfill? What happens in a landfill ?**

Context Based Learning Objective:
Learners will begin to develop a relationship with the reality of all of the waste they produce.
Learners will understand the decomposition process as it relates to Landfills.
Learners will understand the structure of landfills.
Learners will understand the waste of resources involved in items sent to the landfill.

Standards Addressed:

Science 6.A. *Students know the utility of energy sources is determined by factors. . . .*

Science 6.B. *Students know different natural energy and material resources . . . and know how to classify them as renewable or nonrenwable.*

Science 6.C. *Students know the natural origin of the materials used to make common objects.*

Resource: **Closing The Loop, Lesson 2 Away to the Landfill pages 259 - 272**

Summary Description:

In this lesson, Learners will learn how landfills are constructed by building a model landfill in two, two liter soda bottles.

Start by sharing an overhead diagram(CTL 269) and explaining the various layers and materials involved in the making of a landfill.
Discuss the importance of the different layers. Discuss the use of geotextile cushions in landfills.

Next, display a map of the local area that indicates the location of our local landfill. Living on the San Francisco Peninsula, San Mateo County is unique in that our local landfill is extremely close to our local water reservoir. Point both of these sites out on the map.

Now show the learners an overhead of a soda bottle model landfill(CTL 268). Demonstrate to the learners how to cut the bottles safely. Also show the learners how to orient the bottles within each other - its trickier than it seems!

Have the learners work in pairs to construct a model landfill.

After constructing the landfills, provide the learners with clean pieces of waste to introduce into their landfill columns. Instruct the learners to select a piece of waste and then to record initial observations of their column. The learners should now record a prediction of what they believe they will find in four weeks.

Allow learners to make observations daily for the next few weeks. Review the learner's logs occasionally to ensure they are noting changes as they occur.

Lesson 2 (continued)

Note: Be sure to provide a wide range of possible choices for waste. It will lead to a great discussion of what happens to those not so perishable items we tend to through away!

At the end of the four weeks, have the learners assess their initial prediction. Were they correct? Why / why not? Learners should record their thoughts as a final logbook entry.

As a class, record a list of the different items we placed in the landfills. Compare the different types of waste with each other. Which pieces of waste lasted the longest in their original date? Which pieces of waste seemed to breakdown fastest?

Learners will compile their logbook entries, prediction, and conclusion into a report.

Assessment: Each learner will be responsible for turning in a report which lists their prediction, observations, and conclusion. Each report will be scored on our science rubric, scaled 1 - 5, 5 being the top score.

Timeline: **1 60 minute session to construct landfills. Several weeks of observations**

Lesson 3: How many milk cartons fit in a Trash bag? - Relating Volume and Waste

Context Based Learning Objective:
Learners will comprehend volume as a 3 dimensional measurement.
Learners will be able to calculate the volume of cubes and rectangular prisms.
Learners will understand why it is best to squish down their milk cartons at lunch!

Standards Addressed:

Science 6.B. *Students know different natural energy and material resources . . . and know how to classify them as renewable or nonrenewable.*
Science 6.C. *Students know the natural origin of the materials used to make common objects.*
Math Measurement 1.0 *Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems.*

Summary Description:

In order for learners to have a complete understanding of the concept of volume, they need to experience volume in a multitude of ways. This lesson provides an invaluable experience with volume which is atypical and more hands on.

Ask the learners what they do with their milk cartons after they are finished with them at lunch. reflecting on the previous lesson, ask the learners to give some ideas as to what might happen to the milk cartons when they leave campus in trash bags.

Using plastic or latex gloves, the learners should now go out and collect milk cartons from the lunch area. Be sure to instruct the learners to empty the milk cartons.

After collecting a good size sample of milk cartons, ask the learners how much milk each carton holds. Learners should be able to find the capacity of the container on the side of the carton. What does this measurement mean? *Tells us how much liquid fits inside. 3D space taken up by the carton.*

Have the learners count the number of milk cartons. How many are crushed? How many not crushed? What percent of the milk cartons recovered are crushed? Record this info on chart paper for the class.

Do trash bags have a unit of measure? What is the volume of the trash bags? *Learners will be provided with a box of trash bags.*

Lesson 3(continued)

Small Group Activity

How many milk cartons can be put inside one trash bag?
Have the learners work in small groups to figure out how many milk cartons uncrushed will fit into one of the trash bags. Be sure to listen to the different strategies. After ten to fifteen minutes have the groups report their guesses and strategies for solving the problem.

Now have the learners crush all of the milk cartons. How much volume, approximate, do the crushed milk cartons occupy?
The learners may be amazed to find out how much space is wasted in the trash bags due to uncrushed milk cartons!

Assessment: The problem solver of the week, a mainstay in our math routine, will list a series of challenging multi-step word problems which will challenge the learners to expand on their experience. The learners will scored on a rubric, scaled 1-5, which we use weekly for problem solving.

Timeline: **1 45 - 50 minute period**

Lesson 4: Waste Output in the classroom

Context Based Learning Objective:
Learners will analyze the percentage of waste that they recycle on a day to day basis.
Learners will use mass to measure their waste output.
Learners will be able to calculate the percentages as named above.

Standards Addressed:

Math - Algebra and Functions 2.0 - *Students analyze . . . problems involving rate and proportions.*
Science 6.C. *Students know the natural origin of the materials used to make common objects.*

Summary Description:
This lesson is designed as a warm up for the waste audit which happens in the next session. The learners will use only the waste from their classroom.

Learners need to be aware of their own waste output. In order to make the learners better aware of their waste responsibilities, have the learners sort through the trash they have discarded on the day of the lesson. Be sure not to prompt the learners, as they may curb their habits knowing what is coming later on in the day.

Instruct a few learners to collect the trash bins from around the class room. Have those learners weigh the contents of the trash bins.

Next, have the learners sort through the waste separating true waste from waste that could be recycled or reused!
After sorting the trash, re-weigh the three new piles of waste.

Instruct the learners to calculate the percentage of waste that could have been recycled.
What percent of the waste could have been reused?
What percent of the waste was true waste, that is, waste that should head to the landfill?

Now ask the learners, working in small groups, to project what their findings fro the entire school. That is, have the learners assume that our classroom is an average class on our campus. If this statement is true, how much waste(weight) do you think our school throws away in a day? As a school, how much trash (in weight) do we throw away each day that could be recycled?

Have the learners chart the weight of the classroom waste for the first day. Assign a new group of learners each day, for a week, to calculate the waste output in our classroom. Continue the chart and discuss at the end of the week. Was there a change in how we behaved?
Assessment: As a class we will assess our own output of waste, to see if we increase the amount of waste we are reusing and recyclling.
Timeline: 1 45 minute period

Lesson 5: Waste Audit Preparation / Waste Audit

Context Based Learning Objective:
Learners use mass to specifically measure the output of waste from our entire school.

Standards Addressed:

Science 6.A. *Students know the utility of energy sources is determined by factors. . . .*
Science 6.B. *Students know different natural energy and material resources . . . and know how to classify them as renewable or nonrenewable.*
Science 6.C. *Students know the natural origin of the materials used to make common objects.*
Math - Algebra and Functions 2.0 - *Students analyze . . . problems involving rate and proportions.*
Math Measurement 1.0 *Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems.*

Summary Description:

The main purpose of this activity is to demonstrate to the learners, educators and community that waste has a long history after it leaves our trash bins!
Our school has partnered with Recycleworks.org of San Mateo County's Waste Management Division. The information found within this lesson is completely inspired by the great folks at Recycleworks.org, especially Lillian Clark, who has been instrumental in the completion of our waste audit.

Materials needed for the Audit:
8 trash cans 20 large trash bags A scale for weighing the materials in pounds
two washable plastic tarps plastic gloves for each learner
change of clothes permission slips for each learner goggles

Parent Volunteers are quite helpful when completing the waste audit. Volunteers can help by supervising small groups of learners as the audit takes place. We had five parent volunteers.

The tarps are laid down to prevent spillage from happening on the school grounds as you complete the audit. The trash cans are set up to be receptacles for the various categories of waste in which we separate the trash. Lillian provided us with labels for these trash cans - labels clearly illustrate for the learners, where the waste should go.

The waste audit really begins the day before the kids start separating waste. You will need to contact your school site janitor and be sure they bag all of the trash and leave it for your kids to use. All wet waste, which includes waste from the bathrooms and all food products, should be bagged and tied with a red string. Red string indicates to the learners, that we will not open those bags, we will just

Lesson 5 (continued)

weigh those bags and count that as waste. All other waste, such as polystyrene containers and such are considered dry waste. This is the waste we will be sorting.

After the waste is sorted into the various trash bins, the learners will weigh and record the data on large chart paper for the whole class to see. (See attached sheets)

Learners will use this data to do projections of waste output for a week, month, and school year, much the same as they did in the previous lesson.

Assessment: Learners will compare their estimates/predictions from the classroom activity in lesson 4, to the actual data they collected during the audit. In small groups, learners will be asked to analyze the data and write a report which tells our community what changes we should make in our waste management.

Timeline: **2 45 minute preparation periods, 2.5 hours for the audit, 1 45 min follow up session**

Food Waste								
Polystyrene # 6								
Other Plastics # 3, 4, 5, 7								
Yard Waste								
Misc. Items Textiles, Electronics								
Other Waste								

Try and keep your food and green waste separate from the dumpster waste during the audit.
This is not neccssary for a visual audit.

Lesson 6: What do we need to do at the CLC? Persuading the community to take action.

Context Based Learning Objective:
Learners will write an essay persuading the community to take action in our quest to lessen our waste.

Standards Addressed:
Writing Applications 2.5 *Write persuasive compositions*
Writing Strategies 1.1, 1.2, 1.3, and 1.6.

Summary Description:
In the lessons following the waste audit, have the learners discuss the findings.
Pre-write
Brainstorm answers to the following questions and record the list on chart paper.
How can the CLC better manage its waste?
What things can the learners start doing today?
Why do you think we aren't doing these things already?

Share some examples of persuasive writing.

Explain to the class that they will be writing a persuasive essay to convince the learners of the school to make the changes in our day to day lives recommended in the pre-writing session.

Learners work on the rough draft of their essay for the remainder of the period.

Note: The Language Arts / Social Science Educator has agreed to tackle this lesson with the learners. This integrates the curriculum in both classes and provides a nice network of support for the learners. Since we departmentalize the subject areas somewhat, it is essential for us to keep on the same "page" as educators. Our communication throughout this unit will lead to well thought persuasive essays.

Assessment: All persuasive essays will be graded using the "Six Traits", a rubric scaled 1- 6.

Timeline: 2 45 minute sessions plus homework time.

Lesson 7: Trash as Art - Making sculpture with available waste.

Context Based Learning Objective:
Learners will practice conservation and study sculpture techniques.

Standards Addressed:

Science 6.C. *Students know the natural origin of the materials used to make common objects.*

Sculpture: Form and design.

Art education is a value our community holds near to our hearts. There are no standards listed for grade 6, but that doesn't mean they shouldn't exist. Our VOLUNTEER art educator, Leslie Bone was the inspiration and genesis of this lesson.

Summary Description:
Trash can be used to create fabulous works of art. Using waste materials, plastics and cardboard, the learners will exercise their sculpting skills.

To start, the learners will use scraps of paper from the recycling bin or scrap paper bin, to create a model sculpture. We will discuss making models to scale, so that the paper sculptures, drafts if you will, can be scaled up to real life size.

After the learners have their draft sculpture in paper, they will be challenged to use the recycling and waste receptacles on campus to make a trash sculpture version.

We will discuss what types of trash are good candidates for sculpture and define what is definitely not acceptable for use in sculptures. Learners should clean the waste as best they can before handling as a piece for sculpture. Learners may also paint the pieces of waste for artistic form.

Assessment: We will honor the creations of every learner with an exhibit of the trash sculptures. At this exhibit we will invite the community in to view the pieces and to listen to some of the learners reading their persuasive essays.

Timeline: **2- 3 Art Sessions (45min each) and 1 evening hour exhibit (7-8pm)**

Lesson 8: What is a compost bin and how does it work?

Context Based Learning Objective:
Learners will understand how to construct and maintain a compost bin.
Learners will use the internet as a primary source of research as they complete a focused web search.

Standards Addressed:
Writing Strategies 1.4 *Research and Technology*

Summary Description:
Learners in my class are familiar with web-quests, which are internet based research projects. This will not be a full blown web-quest, but I will guide the learners in this project by giving them five links to composting related web-sites from our class homepage. The learners will need to access these links in order to educate themselves on the finer points of composting.

We have two, rather large, compost bins on our campus. Those two bins are at the current time not functioning very efficiently. My intention is for the learners to educate themselves on composting and problem shoot the inefficient bins on campus.

Learners will be asked to develop a plan to correct the compost bins in such a way to make them more efficient. In their plan the learners must also address the lack of use the compost bins are getting currently. Ideally the learners will recognize the science in composting and the social action in getting the learners of our school to use the bins more regularly. *Infrequent use is a large part of the inefficiency of the compost bins.*

Recycleworks.org has been enlisted yet again in this lesson. I used their web-site as a primary source of information for the learners. We have also been nice enough to enlist the help of Jacqueline from Recycleworks.org in troubleshooting our compost bins. With Jacqueline's help, the 5/6 learners will be able to get those compost bins fired up!

Assessment: I daresay that the real life assessment our learners will experience will be whether the compost bins get revived or not. I'm betting on the learners!

Timeline: **Ongoing obligation after this unit ends. The actual web-quest will take 1 45 min period.**